WHAT IS CLAIMED IS:

1. A transmission device performing a signal regeneration control, comprising:

a clock timing extraction circuit dynamically setting a frequency-dividing ratio based on a transmission rate of an input signal to perform a phase synchronization control so that the input signal and an oscillation output have a constant phase difference and extracting a clock timing based on the transmission rate; and

a regeneration control circuit sequentially sweeping a voltage threshold level and a phase of an extracted clock with respect to the input signal to determine whether levels of adjacent monitor points match and to automatically measure a decision point within a valid zone of an eye pattern at which there is the least possibility that error occurs and performing the regeneration control by using the decision point as an optimal point.

2. The transmission device as claimed in claim 1, wherein the clock timing extraction circuit comprises:

phase comparing means for comparing phases of the input signal and a frequency-divided clock to detect a phase difference therebetween;

averaging means for averaging the phase difference to generate a control voltage;

voltage-controlled oscillation means for oscillating a synchronizing clock based on the control voltage;

frequency-dividing means for dividing the frequency of the synchronizing clock to generate the frequency-divided clock; and

phase-locked loop control means for determining whether the control voltage falls within a set range to determine whether a phase-locked loop is in a locked state and dynamically setting the frequency-dividing ratio based on a result of determination.

3. The transmission device as claimed in claim 2, wherein the phase comparing means makes an exclusive-OR operation on a level of a rising edge of the frequency-divided clock and that of a falling edge thereof so that the phase difference is detected as a duty ratio.

4. The transmission device as claimed in claim 2, wherein the phase-locked loop control means sets a frequency-dividing ratio available before power off in the frequency-dividing means at the time of power off and sets a control voltage available before breaking of the input signal in the averaging means when the input signal breaks.

5. The transmission device as claimed in claim 1, wherein the regeneration control circuit comprises:

voltage threshold level setting means for making a decision on the input signal by using the voltage threshold level and generating measured data from the input signal;

clock phase setting means for setting a phase of the clock;

level decision control means for determining whether levels of the adjacent monitor points of the measured data to generate decision information;

decision information hold means for holding the decision information; and

optimal point setting means for identifying a decision point within the valid zone of the eye pattern at which there is the least possibility that error occurs from the decision information obtained by sequentially sweeping the voltage threshold level and the extracted phase of clock and performing the regeneration control in which the decision point thus identified is used as the optimal point.

6. The transmission device as claimed in claim 5, wherein the level decision control means pulls in phase a first output of the measured data triggered by a current clock and a second output of the measured data triggered by a delayed clock obtained by delaying the current clock by a fixed time, makes an exclusive-OR operation on the first and second outputs to make a level decision on the

monitor point and generates the decision information.

7. The transmission device as claimed in claim 5, wherein the optimal point setting means applies an offset adjustment control to the clock timing extraction circuit when a maximum transmission rate of the input signal is equal to the rate of the synchronizing clock to thereby generate a through clock, the clock phase setting means selects the through clock to sweep the clock phase.

8. The transmission device as claimed in claim 5, wherein the optimal point setting means applies a count value control and a digital phase step control to the clock phase setting means when the transmission rate of the input signal is lower than that of the synchronizing clock to thereby generate a clock signal having a different frequency-dividing ratio, and applies an offset adjustment control to the clock timing extraction circuit to thereby generate a frequency-divided signal based on the clock signal, the clock phase setting means selects the frequency-divided clock to sweep the clock phase.

9. The transmission device as claimed in claim 5, wherein the optimal point setting means sets a reset cycle based on an error rate corresponding to the transmission rate of the input signal, and resets the decision information held in the decision information holding means

on the basis of the reset cycle.

10. The transmission device as claimed in claim 9, wherein the optimal point setting means controls to shift a next monitor point without waiting for the reset cycle when recognizing that the decision information is indicative of error.

11. The transmission device as claimed in claim 5, wherein the optimal point setting means comprises a memory for memorizing the decision information about the monitor points, and determines, as the optimal point, a monitor point located in a memory area in which there is the least error with respect to the voltage threshold level and the clock phase.

12. The transmission device as claimed in claim 11, wherein the optimal point setting means memorizes the voltage threshold level and the clock phase at the monitor point determined as the optimal point, and performs the regeneration control using the memorized voltage threshold level and the clock phase at the time of restart.

13. A clock timing extraction circuit extracting a clock timing from an input signal, comprising:

phase comparing means for comparing a phase of the input signal and that of a frequency-divided clock to

thereby detect a phase difference;

averaging means for averaging the phase difference to thereby generate a control voltage;

voltage-controlled oscillation means for oscillating a synchronizing clock based on the control voltage;

frequency-dividing means for dividing the frequency of the synchronizing clock to generate the frequency-divided clock; and

phase-locked loop control means for determining whether the control voltage falls within a set range to determine whether a phase-locked loop is in a locked state and dynamically setting the frequency-dividing ratio based on a result of determination.

14. A regeneration control circuit performing a regeneration control of an input signal, comprising:

voltage threshold level setting means for making a decision on the input signal by using a voltage threshold level and generating measured data from the input signal;

clock phase setting means for setting a phase of a clock for decision making;

level decision control means for determining whether levels of adjacent monitor points of the measured data to generate decision information;

decision information hold means for holding the decision information; and

optimal point setting means for identifying a decision point within a valid zone of an eye pattern at which there is the least possibility that error occurs from the decision information obtained by sequentially sweeping the voltage threshold level and the phase of the clock with respect to the input signal and performing the regeneration control in which the decision point thus identified is used as an optimal point.

15. An optical receiver receiving a light signal and performing a regeneration control, comprising:

an opto-electric conversion unit converting the light signal into an electric signal;

a filtering unit performing a waveform equalizing control of the electric signal;

a clock timing extraction unit dynamically setting a frequency-dividing ratio based on a transmission rate of the input signal to perform a phase synchronization control so that there is a fixed phase difference between the input signal and an oscillation output and extracting a clock timing based on the transmission rate; and

a regeneration control unit sequentially sweeping a voltage threshold level and an extracted phase of clock with respect to the input signal to automatically measure a decision point within a valid zone of an eye pattern at which there is the least possibility that error occurs, the decision point thus identified being used as an

optimal point.